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COMMISSION

WATER POLLUTION SURVEY

of the

CITY OF ST. THOMAS

COUNTY OF ELGIN

1966

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REPORT

ON A

WATER POLLUTION SURVEY

OF THE

CITY OF ST. THOMAS

COUNTY OF ELGIN

MARCH 1966

DIVISION OF SANITARY ENGINEERING

REPORT

ONTARIO WATER RESOURCES COMMISSION

INTRODUCTION

A water pollution survey of water quality in surface water drains, storm sewers, and watercourses within the City of St. Thomas was conducted on March 7, 8, 9 and 10, 1966.

Mr. L.D. House, P.Eng., City Engineer, provided information pertinent to the survey. Mr. S. Acton, Superintendent of Works, assisted in the sampling programme.

GENERAL

The City of St. Thomas has a 1965 assessed population of 22,691 (1965 Municipal Directory). The City is located on the Kettle Creek watercourse about nine miles north of Lake Erie and approximately in the geographic centre of the County of Elgin.

In general, drainage waters from the area discharge into the Kettle Creek watercourse. However, local drainage for various sections of the city is provided by Mill Creek and its branches, the Smith-Carr drain, and the Caughell drain, all of which discharge into Kettle Creek.

SEWERAGE WORKS

The major portions of the developed areas of the city including industrial, commercial, and residential properties, are serviced by sanitary and storm sewer systems. A few isolated

properties rely on private waste treatment systems.

Sanitary sewer collections are treated in an activated sludge type water pollution control plant, with a capacity of 4.5 million gallons per day. The plant effluent is discharged into Kettle Creek. The capacity of the plant recently has been increased from 3 mgd to 4.5 mgd.

Sanitary sewage from three relatively small residential areas is collected and treated in municipal septic tank systems. The effluent from these systems is discharged into Kettle Creek. The installations are designated as the St. George St., the Talbot Street and the Walnut Street septic tanks.

INDUSTRIAL WASTE TREATMENT

An industrial waste control by-law is currently being instituted by the city.

The bulk of processing wastes is being discharged into the sanitary sewer system. It was reported, however, that some wastes from some manufacturing operations are discharged at times into the storm water system. At the time of the survey, waste from the Canada Iron Foundries Company Limited was being discharged into the Smith-Carr drain (Sample KS 14.7B).

WATER POLLUTION

As a measure in assessing the level of pollution being discharged from the city, water samples were collected where

possible from the flows of all known surface water drains and storm sewers. Representative samples were also collected from the receiving waters throughout the area. These waters include the Caughell drain, the Smith-Carr drain, Mill Creek and branches, and Kettle Creek.

The sanitary chemical analyses and the bacteriological examination results of the samples collected are shown on Tables 1,2,3,4, and 5, respectively.

The location of sampling points are designated on the accompanying map by Kettle Creek watercourse mileage distances from Lake Erie.

INTERPRETATION OF LABORATORY ANALYSES

For convenience in the interpretation of laboratory analyses, the Ontario Water Resources Commission objectives for water quality pertaining to surface-water drains, storm sewers and watercourses are listed:

Surface-Water Drains and Storm Sewers

5-Day BOD (Biochemical Oxygen Demand)
- not greater than 15 parts per million (ppm)

Suspended Solids Content
- not greater than 15 parts per million (ppm)

Coliforms - Membrane Filter (M.F.)
- not greater than 2400 per 100 millilitres (ml)

Anionic Detergent (ABS)
- the presence of anionic detergent usually indicates pollution from domestic sources.

WATERCOURSES

5-Day BOD (Biochemical Oxygen Demand)
- not greater than 4 parts per million (ppm)

Coliform Count
- not greater than 2400 per 100 Millilitres (ml)

SIGNIFICANCE OF LABORATORY ANALYSES

A total of 42 drains were investigated with eight outfalls to the Caughell Drain, 18 to the Mill Creek watercourse, eight to the Smith-Carr Drain, and eight to Kettle Creek. Of this total, six contained no flow at the time of the inspection, while the remaining 36 had varying rates of flow from a trickle to an estimated flow of 20 to 25 gallons per minute.

It is noted that varying concentrations of Anionic detergent is present in almost all of the flows examined. This condition along with the excessively high coliform counts does indicate that some domestic waste is gaining access to some of the surface water drains. The presence of other ingredients such as ether solubles, phenols or chlorides, indicate that wastes from industrial operations are the probable sources of the pollution.

SURFACE WATER QUALITY

1. Caughell Drain drainage area.

At the time of the survey, the level of pollution in the Caughell Drain was relatively low. (KC 16.36, K 16.50).

It is noted however that there was indication that some industrial waste was gaining access to the upper reaches of

the drain (KC 16.50) probably from one or more of the industrial operations in the north-east industrial area.

Attention is drawn to the discharge from an open ditch at Hughes and Wolfe Streets (KC 16.37). Characteristic evidence of untreated domestic sewage was observed in this drain.

The flow from private drain outfalls opposite Number 5 Brock Street (KC 16.35) and 280 Inkerman Street (KC 16.44) also contained indications of domestic sewage.

2. Mill Creek and Branches

The level of pollution in the Mill Creek watercourse was relatively low at the time of the survey, as indicated by the laboratory analyses of water samples collected at points KM 12.2, KM 12.8 and KMN 13.5.

Excessive pollution is indicated in the Ross Street storm sewer flow (KM 13.25). This sewer starts near the Ross Street subway and outfalls into a ravine at the rear of Alma College grounds. The contamination is probably from domestic sewage being discharged through illegal drain connections to the storm sewer.

Visible polluting materials were present in the discharge flow from The General Hospital storm sewer (KM 14.35). The outfall is located in a ravine at the south end of Wood Street.

3. Smith-Carr Drain (Upper reaches of the north Branch of Mill Creek)

The level of pollution in the Smith-Carr Drain section of the Mill Creek watercourse was also relatively low at the time of inspection, as indicated by the laboratory analyses of water samples collected at points KMS 14.49 and KMS 14.69.

Attention is drawn, however, to the excessively high level of contamination being discharged into the watercourse from the Wellington Street storm sewer (KMS 14.60). The types of contamination, as revealed by the laboratory analyses of water samples, indicate that the discharge of domestic sewage and other wastes into the storm sewer is the probable source of the pollution.

The laboratory analyses showed that waste water being discharged into the Smith-Carr drain at outfall KMS 14.7B contained objectionable levels of chloride, iron and phenol compounds. The discharge flow with an estimated volume of 25 to 35 gallons per minute, was a greyish-black colour. It is therefore probable that inadequately treated waste from the Canada Foundries Company Limited, located at Talbot Street and First Avenue, is the source of the polluting materials.

An open ditch on the east side of First Ave. and south of the New York Central Railway also contained objectionable concentrations of chloride, iron, and phenol compounds. The presence of these compounds in this drain indicate that inadequately treated

wastes, from one or more industrial operations in the Talbot Street East industrial area, continue to be discharged into the watercourse.

4. Kettle Creek

The level of pollution in the City of St. Thomas section of the Kettle Creek watercourse was relatively low at the time of inspection. (K 11.8, K 12.0, K 15.5, and K 17.2).

Attention is directed, however, to the water quality of effluent discharges from three municipal sanitary sewage treatment operations.

(a) St. George Street Septic Tank System (K 15.5)

At the time of inspection, there was an estimated flow of 5 to 6 gallons per minute. The colour and odour characteristics were indicative of inadequate treatment. The excessively high sanitary chemical analyses and the bacteriological examinations of water samples collected from the effluent indicate this discharge to be a major source of pollution to the watercourse.

(b) Walnut Street Septic Tank System (K 13.75)

At the time of inspection, the estimated discharge flow from this system was 20 to 30 gallons per minute. Visible characteristics and laboratory analyses of samples collected from the effluent, indicate that this discharge is also a major factor in contributing to pollution in the watercourse.

(c) Talbot Street West Septic Tank System (K 14.2)

At the time of inspection, the discharge flow from this system was estimated at 2 to 3 gallons per minute.

The laboratory analyses of samples from the effluent indicated the presence of inadequately treated sanitary sewage. The discharge from this operation is also considered to be adding to the pollution of Kettle Creek.

SUMMARY

A water pollution survey of surface-water drains, storm sewers, and watercourses within the City of St. Thomas was conducted on March 7, 8, 9, and 10, 1966.

Based on the observations and findings of this survey, it was evident that quantities of polluting materials were gaining access to the watercourses within the city.

Areas of discharge which are exceeding the objectives for water quality, and which are considered as major sources of pollution to the receiving watercourse are tabulated:

Wastes which are permitted to be discharged into a municipal surface-water drain, or storm sewer, become the responsibility of the municipality for treatment and disposal. The responsibility for wastes discharged from industrial drains or private drains rests with the industry or individual.

Receiving Waters	Point of Outfall	Description
Caughell Drain	KC 16.37	- Hughes and Wolfe Sts. - open ditch - sanitary sewage.
	KC 16.44	- Opposite 280 Inkerman St.- private drain - sanitary sewage.
	KC 16.35	- Opposite 5 Brock St. private drain, sanitary sewage.
	K 16.50	- Edward St. extension open ditch, industrial waste.
Mill Creek	KM 13.25	- Ross St. storm sewer sanitary sewage.
	KM 14.35	- General Hospital storm sewer - sanitary sewage.
Smith-Carr Drain	KMS 14.60	- Wellington St. storm sewer. - sanitary sewage - West side of First Street.
	KMS 14.78	- Drain containing waste from Canada Iron Foundries Ltd. industrial waste
	KMS 14.75	- East of First St. South of N.Y.C. Railway - open ditch - industrial waste
Kettle Creek	K 15.5	- St. George St. septic tank system. - sanitary sewage
	K 13.7	- Walnut St. septic tank system. - sanitary sewage
	K 14.2	- Talbot St. septic tank system - sanitary sewage

RECOMMENDATIONS

In consideration of the observations and findings of this water pollution survey, the following recommendations are presented.

1. The City of St. Thomas should continue its pollution abatement programme by providing the necessary means to prevent the discharge of untreated and inadequately treated waste and sewage into any watercourse.

2. Specific and immediate measures should be instituted to eliminate the discharge of inadequately treated waste from the St. George Street Septic Tank System, the Walnut Street Septic Tank System, and the Talbot Street West Septic Tank System.

Wastes currently being collected into these systems should be re-directed into the main sewerage works for treatment.

3. Private drains, through which inadequately treated wastes are being discharged into any surface-water drain or watercourse, should be located and severed.

Specifically, drainage areas serviced by the Wellington Street, Ross Street and General Hospital storm sewers, should be investigated and the necessary measures taken to eliminate the discharge of polluting materials from these drains.

4. The discharge of untreated waste and other polluting materials from the Canada Iron Foundries Company Limited should be discontinued.

5. The pollution survey revealed that quantities of industrial waste are gaining access to the surface water drains in the eastern and north-eastern drainage areas. It is therefore recommended that the treatment and disposal of wastes from industries in the area be reviewed and remedial measures adopted as required.

Approved by: _____

J.M. Timko, P.Eng.,
District Engineer,
Division of Sanitary Engineering.

bw

Prepared by:

J.K. Ferris

TABLE I

CITY OF ST. THOMAS - WATER POLLUTION SURVEY

SURFACE WATER DRAINS AND STORM SEWERS

OUTFALLS TO CAUGHELL DRAIN

Location of Sampling Points	Description Sampling Points	5-Day BOD (ppm)	SOLIDS Total (ppm)	SOLIDS Susp. (ppm)	SOLIDS Diss. (ppm)	Anionic Detergent as ABS (ppm)	Other	Coliforms per 100 ml Membrane Filter
KC 16.25	Barwick and Hill Sts. S.S. (Storm Sewer)	13.0	776	86	690	2.1	-	Broken in Transit.
KC 16.30	Montcalm-Tecumseh and Hughes Sts. area-S.S.	12.0	640	21	619	7.6	-	43,000
KC 16.35	Private drain opposite No.5 Brock St. - S. (Sanitary)	10.0	642	186	456	0.8	-	230,000
KC 16.37	North-West Corner of Hughes and Wolfe Sts. -D (Open Ditch)	110.0	1090	516	574	3.7	-	100,000
KC 16.40	Woodworth-Patricia Inkerman St.area -S.	3.0	614	7	607	0.8	-	50
KC 16.43	Inkerman-Edward St. area - S.S.	0.9	440	1	439	-	Ether Solubles 0.0	120,000
KC 16.44	Private drain - S. opposite 280 Inkerman St.	210.0	-	-	-	3.8	-	79,000
KC 16.51	E. of Woodworth N. of Fritch Subd. - D.	SAMPLE BROKEN IN TRANSIT						100,000

TABLE 2

CITY OF ST. THOMAS - WATER POLLUTION SURVEY

SURFACE WATER DRAINS AND STORM SEWERS

OUTFALLS TO MILL CREEK AND TRIBUTARIES

Location of Sample Points	Description of Sampling Points	5-Day BOD (ppm)	SOLIDS Total (ppm)	SOLIDS Susp. (ppm)	SOLIDS Diss. (ppm)	Anionic Detergent as ABS (ppm)	Other	Coliforms per 100 ml Membrane Filter
KM 12.45	Stanley-Margaret Sts. areas - S.S.	6.4	888	108	780	0.4	-	22,100
KM 12.46	West-Chester-Willow Sts. areas - S.S.	16.0	1216	846	370	1.3	-	100,000
KM 12.80	White-Mitchell-Hinks Gladstone Sts. areas-S.S.	6.8	1100	148	952	0.6	-	230,000
KM 13.15	Wilson-Regent Sts. areas - S.S.	NO FLOW						
KM 13.25	Ross St. area - S.S. (Rear of Alma College)	62.0	972	20	952	2.6	-	20,000
KM 13.50	Elm St.-S.S. at Pinafore Park	0.6	820	14	806	2.6	-	0
KM 13.51	Elmina St. - S.S.	7.0	564	37	527	1.6	-	2,600,000
KM 14.10	Pinafore Cres.-S.S.	NO FLOW						
KM 14.20	Mandville St.-S.S. at Hepburn St.	NO FLOW						

TABLE 2 (Continued)

CITY OF ST. THOMAS - WATER POLLUTION SURVEY

SURFACE WATER DRAINS AND STORM SEWERS

OUTFALLS TO MILL CREEK AND TRIBUTARIES

Location of Sampling Points	Description of Sampling Points	5-Day BOD (ppm)	SOLIDS Total (ppm)	SOLIDS Susp. (ppm)	SOLIDS Diss. (ppm)	Anionic Detergent as ABS (ppm)	Other	Coliforms per 100 ml Membrane Filter
KM 14.25	South of Mandeville St. between Hepburn and Wood Sts.-S.S.	NO FLOW						
KM 14.35	General Hospital S.S. at Wood & Mandeville Sts.-S.S.	85.0	636	66	570	0.1	Ether Solubles 81.0	33,000
KM 14.37	Thompson Ave.-S.S.	1.0	634	37	597	0.2	Ether Solubles 0.8	50
KM 14.50	Ashton Place - S.S.	NO FLOW						
KM 14.55	Aldborough Ave.-S.S.	10.0	496	18	478	1.1	-	370,000
KMN 14.10	High-Chestnut Sts. and First Ave. areas-S.S. (Centre Collegiate)	3.8	484	5	479	0.4	-	300,000
KMN 14.25	Outfall from Hitch's Pond area. -D	3.0	530	35	495	0.3	-	21,000
KMN 14.20	St. Joseph-Elm Sts.-S.S.	14.0	3084	1954	1130	0.2	-	270
KMN 14.30	St. Joseph-Jane Sts. - S.S.	6.0	544	29	515	0.7	-	210,000

TABLE 3

CITY OF ST. THOMAS - WATER POLLUTION SURVEY

SURFACE WATER DRAINS AND STORM SEWERS

OUTFALLS TO SMITH-CARR DRAIN

Location of Sampling Points	Description of Sampling Points	5-Day BOD (ppm)	SOLIDS Total (ppm)	SOLIDS Susp. (ppm)	SOLIDS Diss. (ppm)	Anionic Detergent as ABS (ppm)	Other	Coliforms per 100 ml Membrane Filter
KMS 13.90	Fifth Ave.Myrtle St. and Locust St. areas - S.S.	10.0	738	10	728	3.8	-	200,000
KMS 14.0	Lydia,Wellington, Myrtle Sts. and Fourth Ave.areas - S.S.	NO FLOW						
KMS 14.50	Forest Ave.,Third Ave.areas-S.S.	7.0	1064	52	1012	1.3	-	320,000
KMS 14.60	Wellington St.-S.S. Part of Fairview, Park, Mary,Forest and Erie Sts.	44.0	806	92	714	7.6	-	5,300,000
KMS 14.7A	Park St.-S.S.	16.0	764	62	702	0.3	-	300

TABLE 3 (Continued)

CITY OF ST. THOMAS - WATER POLLUTION SURVEY

SURFACE WATER DRAINS AND STORM SEWERS

OUTFALLS TO SMITH-CARR DRAIN

Location of Sampling Points	Description of Sampling Points	5-Day BOD (ppm)	SOLIDS Total (ppm)	SOLIDS Susp. (ppm)	SOLIDS Diss. (ppm)	Anionic Detergent as ABS (ppm)	Other	Coliforms per 100 ml Membrane Filter
KMS 14.7B	West Side of 1st. Ave. drain from Canada Iron Co.-S.	2.4	750	164	586	0.1	Chloride (Cl) 84 Iron (Fe) 5.2 Phenols (ppb) 20.0	8,100
KMS 14.75	Ditch on south side of N.Y.C. Tracks-East of First St.-D.	0.8	920	38	882	0.1	Chloride (Cl) 92 Iron (Fe) 3.33 Phenols (ppb) 4.0	90
KMS 15.00	At Park and Steel Sts. from Twp. of Yarmouth - S.S.	2.2	580	29	551	0.5	-	4,700

TABLE 4

CITY OF ST. THOMAS - WATER POLLUTION SURVEY

SURFACE WATER DRAINS - STORM SEWERS - WATER POLLUTION CONTROL PLANTS

OUTFALLS TO KETTLE CREEK

Location of Sampling Points	Description of Sampling Points	5-Day BOD (ppm)	SOLIDS Total (ppm)	SOLIDS Susp. (ppm)	SOLIDS Diss. (ppm)	Anionic Detergent as ABS (ppm)	Other	Coliforms per 100 ml Membrane Filter
K 11.85	Effluent from old WPCP.	1.2	622	11	611	1.9	-	11,200
K 11.90	Effluent from new WPCP.	15.0	622	26	596	1.8	-	8,300
K 13.75	Effluent from the Walnut St. Septic Tank System.	82.0	712	90	622	4.5	-	7,000,000
K 14.2	Effluent from the Talbot St.W. Septic Tank System.	14.0	1140	172	968	4.1	-	420,000
K 15.5	Effluent from the St. George St. Septic Tank System.	145.0	1024	194	830	20.0	-	4,000,000
K 15.51	St. George St.-S.S.-S.E. Corner of Bridge(12" Sewer)	5.0	1722	25	1697	0.4	-	100,000
K 15.52	St. George St.-S.S. extends to St. Catherine St. (36" Sewer)	10.0	512	50	462	1.3	-	270,000
K 16.6	Balaelava S.S. between Edgeware Rd. & Hammond St.	8.0	680	19	661	0.4	-	580,000

TABLE 5

CITY OF ST. THOMAS - WATER POLLUTION SURVEY

WATERCOURSES - ST. THOMAS SECTIONS

Location of Sampling Points	Description of Sampling Points	5-Day BOD (ppm)	SOLIDS Total (ppm)	SOLIDS Susp. (ppm)	SOLIDS Diss. (ppm)	Anionic Detergent as ABS (ppm)	Other	Coliforms per 100 ml Membrane Filter
KC 16.36	Caughell Drain at Hughes St.	4.0	536	4	532	0.3	-	12,300
KC 16.50	Caughell Drain at Edward St. Extension.	2.0	582	11	571	-	Phenols(ppb) 8	5,000
KM 12.2	Mill Cr. at Hwy.#4.	2.8	464	47	417	0.2	-	1,400
KM 12.8	Mill Cr. at Elm St. -Outfall from Pinafore Lake.	1.2	360	63	297	0.1	-	430
KMN 13.5	Mill Cr. North Branch at Elmina St.	2.4	598	6	592	0.2	-	3,100
KMS 14.49	Mill Cr. Smith-Carr drain at Forest Ave.	4.0	704	57	647	0.3	-	6,400
KMS 14.69	Mill Cr. Smith-Carr drain North of Wellington St.	9.6	794	128	666	0.4	-	7,700

TABLE 5 (Continued)

CITY OF ST. THOMAS - WATER POLLUTION SURVEY

WATERCOURSES - ST. THOMAS SECTIONS

Location of Sampling Points	Description of Sampling Points	5-Day BOD (ppm)	SOLIDS Total (ppm)	SOLIDS Susp. (ppm)	SOLIDS Diss. (ppm)	Anionic Detergent as ABS (ppm)	Other	Coliforms per 100 ml Membrane Filter
K 11.8	Kettle Creek at Chesapeak and Ohio Railway	4.8	410	49	361	0.1	-	240
K 12.0	Kettle Creek at Southwold St.	1.6	396	26	370	0.0	-	1,400
K 15.5	Kettle Creek at St. George St.	1.4	338	25	313	0.1		124
K 17.2	Kettle Creek at Upper Reservoir Dam.	1.8	350	29	321	0.1	-	12